

$f_2(1950)$ $I^G(J^{PC}) = 0^+(2^{++})$

NODE=M135

 $f_2(1950)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1944±12 OUR AVERAGE			Error includes scale factor of 1.5. See the ideogram below.
1930±25	¹ BINON 05	GAMS	33 $\pi^- p \rightarrow \eta\eta n$
2010±25	ANISOVICH 00J	SPEC	
1940±50	BAI 00A	BES	$J/\psi \rightarrow \gamma(\pi^+\pi^-\pi^+\pi^-)$
1980±22	² BARBERIS 00C		450 $pp \rightarrow pp4\pi$
1940±22	³ BARBERIS 00C		450 $pp \rightarrow pp2\pi^0\pi^0$
1980±50	ANISOVICH 99B	SPEC	1.35–1.94 $p\bar{p} \rightarrow \eta\eta\pi^0$
1960±30	BARBERIS 97B	OMEG	450 $pp \rightarrow pp2(\pi^+\pi^-)$
1918±12	ANTINORI 95	OMEG	300,450 $pp \rightarrow pp2(\pi^+\pi^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
2038 ⁺¹³⁺¹² ₋₁₁₋₇₃	⁴ UEHARA 09	BELL	$10.6 e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
1980± 2±14	ABE 04	BELL	$10.6 e^+e^- \rightarrow e^+e^-K^+K^-$
1867±46	⁵ AMSLER 02	CBAR	$0.9 \bar{p}p \rightarrow \pi^0\eta\eta, \pi^0\pi^0\pi^0$
~1990	⁶ OAKDEN 94	RVUE	0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
1950±15	⁷ ASTON 91	LASS	$11 K^-p \rightarrow \Lambda K\bar{K}\pi\pi$

1 First solution, PWA is ambiguous.

2 Decaying into $\pi^+\pi^-2\pi^0$.3 Decaying into $2(\pi^+\pi^-)$.4 Taking into account $f_4(2050)$.

5 T-matrix pole.

6 From solution B of amplitude analysis of data on $\bar{p}p \rightarrow \pi\pi$. See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J=3$ to be important but not significantly resonant.

7 Cannot determine spin to be 2.

NODE=M135M

NODE=M135M

OCCUR=2

NODE=M135M;LINKAGE=BI

NODE=M135M;LINKAGE=A4

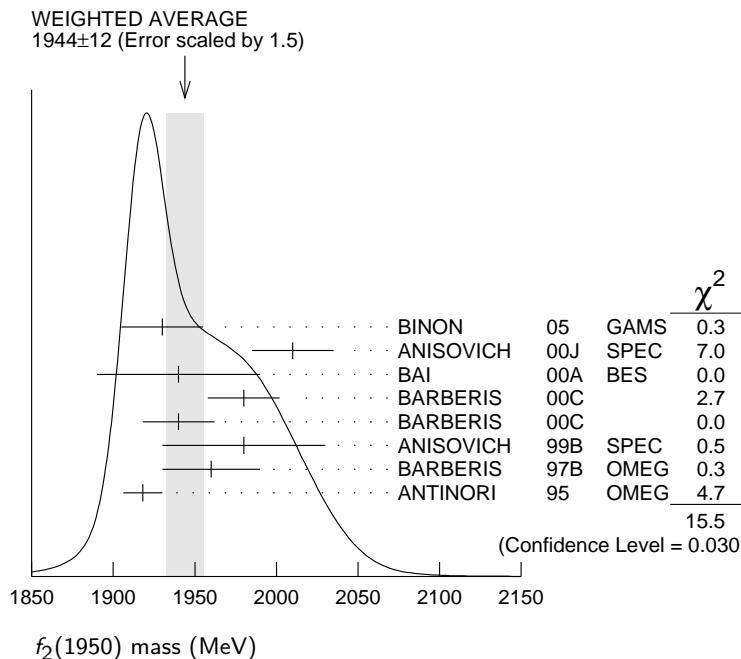
NODE=M135M;LINKAGE=B4

NODE=M135M;LINKAGE=UE

NODE=M135M;LINKAGE=TT

NODE=M135M;LINKAGE=BB

NODE=M135M;LINKAGE=A

 **$f_2(1950)$ WIDTH**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
472± 18 OUR AVERAGE			
450± 50	⁸ BINON 05	GAMS	33 $\pi^- p \rightarrow \eta\eta n$
495± 35	ANISOVICH 00J	SPEC	
380 ⁺¹²⁰ ₋₉₀	BAI 00A	BES	$J/\psi \rightarrow \gamma(\pi^+\pi^-\pi^+\pi^-)$
520± 50	⁹ BARBERIS 00C		450 $pp \rightarrow pp4\pi$

NODE=M135W

NODE=M135W

485 ± 55	10	BARBERIS	00C	450 $p\bar{p} \rightarrow p\bar{p}4\pi$
500 ± 100		ANISOVICH	99B	SPEC 1.35–1.94 $p\bar{p} \rightarrow \eta\eta\pi^0$
460 ± 40		BARBERIS	97B	OMEG 450 $p\bar{p} \rightarrow p\bar{p}2(\pi^+\pi^-)$
390 ± 60		ANTINORI	95	OMEG 300,450 $p\bar{p} \rightarrow p\bar{p}2(\pi^+\pi^-)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

441 + 27 + 28 25 – 192	11	UEHARA	09	BELL 10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
297 ± 12 ± 6		ABE	04	BELL 10.6 $e^+e^- \rightarrow e^+e^-K^+K^-$
385 ± 58	12	AMSLER	02	CBAR 0.9 $\bar{p}p \rightarrow \pi^0\eta\eta, \pi^0\pi^0\pi^0$
~ 100	13	OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
250 ± 50	14	ASTON	91	LASS 11 $K^-p \rightarrow \Lambda K\bar{K}\pi\pi$

8 First solution, PWA is ambiguous.

9 Decaying into $\pi^+\pi^-2\pi^0$.

10 Decaying into $2(\pi^+\pi^-)$.

11 Taking into account $f_4(2050)$.

12 T-matrix pole.

13 From solution B of amplitude analysis of data on $\bar{p}p \rightarrow \pi\pi$. See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.

14 Cannot determine spin to be 2.

OCCUR=2

NODE=M135W;LINKAGE=BI
NODE=M135W;LINKAGE=A4
NODE=M135W;LINKAGE=B4
NODE=M135W;LINKAGE=UE
NODE=M135W;LINKAGE=TT
NODE=M135W;LINKAGE=BB

NODE=M135W;LINKAGE=A

NODE=M135215;NODE=M135

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 K^*(892)\bar{K}^*(892)$	seen
$\Gamma_2 \pi\pi$	
$\Gamma_3 \pi^+\pi^-$	seen
$\Gamma_4 \pi^0\pi^0$	seen
$\Gamma_5 4\pi$	seen
$\Gamma_6 \pi^+\pi^-\pi^+\pi^-$	
$\Gamma_7 a_2(1320)\pi$	
$\Gamma_8 f_2(1270)\pi\pi$	
$\Gamma_9 \eta\eta$	seen
$\Gamma_{10} K\bar{K}$	seen
$\Gamma_{11} \gamma\gamma$	seen
$\Gamma_{12} p\bar{p}$	seen

$f_2(1950) \Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(K\bar{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_{10}\Gamma_{11}/\Gamma$
VALUE (eV)	DOCUMENT ID TECN COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

122 ± 4 ± 26	15	ABE	04	BELL 10.6 $e^+e^- \rightarrow e^+e^-K^+K^-$
15 Assuming spin 2.				

NODE=M135225

NODE=M135G1
NODE=M135G1

NODE=M135G1;LINKAGE=AB

NODE=M135G2
NODE=M135G2

NODE=M135G2;LINKAGE=UE

NODE=M135220

NODE=M135R1
NODE=M135R1

NODE=M135R3
NODE=M135R3

$\Gamma(K^*(892)\bar{K}^*(892))/\Gamma_{\text{total}}$	Γ_1/Γ
seen	ASTON 91 LASS 0 11 $K^-p \rightarrow \Lambda K\bar{K}\pi\pi$

$\Gamma(a_2(1320)\pi)/\Gamma_{\text{total}}$	Γ_7/Γ
VALUE	DOCUMENT ID TECN COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

not seen	BARBERIS	00B	450 $p\bar{p} \rightarrow p_f\eta\pi^+\pi^-p_s$
not seen	BARBERIS	00C	450 $p\bar{p} \rightarrow p_f4\pi p_s$
possibly seen	BARBERIS	97B	OMEG 450 $p\bar{p} \rightarrow p\bar{p}2(\pi^+\pi^-)$

$\Gamma(\eta\eta)/\Gamma(4\pi)$				Γ_9/Γ_5
<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>	
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$				
$<5.0 \times 10^{-3}$	90	BARBERIS	00E 450 $p p \rightarrow p_f \eta \eta p_s$	
$\Gamma(\eta\eta)/\Gamma(\pi^+\pi^-)$				Γ_9/Γ_3
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.14±0.05	AMSLER	02	CBAR 0.9 $\bar{p} p \rightarrow \pi^0 \eta \eta, \pi^0 \pi^0 \pi^0$	
$\Gamma(p\bar{p})/\Gamma_{\text{total}}$				Γ_{12}/Γ
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	111	ALEXANDER	10	CLEO $\psi(2S) \rightarrow \gamma p\bar{p}$

$f_2(1950)$ REFERENCES

ALEXANDER	10	PR D82 092002	J.P. Alexander <i>et al.</i>	(CLEO Collab.)
UEHARA	09	PR D79 052009	S. Uehara <i>et al.</i>	(BELLE Collab.)
BINON	05	PAN 68 960	F. Binon <i>et al.</i>	
		Translated from YAF 68 998.		
ABE	04	EPJ C32 323	K. Abe <i>et al.</i>	(BELLE Collab.)
AMSLER	02	EPJ C23 29	C. Amsler <i>et al.</i>	
ANISOVICH	00J	PL B491 47	A.V. Anisovich <i>et al.</i>	
BAI	00A	PL B472 207	J.Z. Bai <i>et al.</i>	(BES Collab.)
BARBERIS	00B	PL B471 435	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	00C	PL B471 440	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	00E	PL B479 59	D. Barberis <i>et al.</i>	(WA 102 Collab.)
ANISOVICH	99B	PL B449 154	A.V. Anisovich <i>et al.</i>	
BARBERIS	97B	PL B413 217	D. Barberis <i>et al.</i>	(WA 102 Collab.)
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)
ANTINORI	95	PL B353 589	F. Antinori <i>et al.</i>	(ATHU, BARI, BIRM+) JP
OAKDEN	94	NP A574 731	M.N. Oakden, M.R. Pennington	(DURH)
ASTON	91	NPBPS B21 5	D. Aston <i>et al.</i>	(LASS Collab.)

NODE=M135R5
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NODE=M135R07

NODE=M135

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